

## Undergraduate Research Symposium May 18, 2018 Mary Gates Hall

### Online Proceedings

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#### POSTER SESSION 1

Commons East, Easel 44

11:00 AM to 1:00 PM

##### **Negotiations of Identity and Intersectionality of Asian American and Pacific Islander Artist in the Art World in Seattle**

*Mara M. Kage, Senior, Sociology*

*UW Honors Program*

*Mentor: Alexis Harris, Sociology*

*Mentor: Kyle Crowder, Sociology*

Identity is constructed by the intersection of many different categories that are supported or marginalized by the society depending on variables such as context, time, place and group values. This study sought to investigate how the categorical intersections of identities as sociological concepts were informed, challenged or supported through the experiences of integration and marginalization of Asian Pacific Islander American artists in the progressive city of Seattle. In the micro level, it is experienced through daily social interactions within the community and on a macro level through educational programs and social policies. These mixed methods studies developed 1- a quantitative statistical descriptive analysis disaggregating 9 APIA subgroups by residential dispersion on tract level and basic socioeconomic parameters in King County and 2- a qualitative research focusing on 12 in-depth interviews with self-identified APIA artists contrasting race and gender identities by heterosexual and LGBT. The APIA racial category unique experience is understudied in the field and I sought to address this gap by contrasting current pervasive narratives and stereotypes. This was addressed via unpacking the reality of personal experiences of artists providing intimate insights on the shifting dynamics negotiating these identities. The study controlled for similarities of experiences and outcomes framing analysis through the grounded theory methods of utilizing data and inquiry to derive theory. In order to understand experiences of multiple marginalizations, it's important to address a multitude of intersecting categories. In short, until we see it, it doesn't exist. I expect to find that experiences of marginalizations increase when intersecting race/ethnicity of APIA artists with non-heterosexual gender and sexual identities.

#### POSTER SESSION 2

MGH 241, Easel 129

1:00 PM to 2:30 PM

##### **Characterizing the Interaction of the hDLG1 PDZ Domains to the Alpha-1D Adrenergic Receptor**

*George Williams, Sophomore, Pre-Sciences*

*Mentor: Dorathy-Ann Harris, Pharmacology*

*Mentor: Chris Hague, Pharmacology, University of Washington School of Medicine*

The alpha-1D adrenergic receptor (A1DAR) is a G-protein coupled receptor (GPCR) and is known for its function as a regulator for cardiovascular, urinary, and central nervous system function. This unique GPCR has a PDZ ligand at the C-terminus of this receptor. A PDZ ligand is a region on a protein that can bind to a PDZ domain on another protein and is named based on the three proteins that it was observed in. Previously, it has been discovered that this ligand interacts with the syntrophin family of PDZ domain proteins. The hDLG1 protein is a human homologue of the Drosophila disc large (DLG1) tumor suppressor protein and contains three PDZ domains that have been implicated in interacting with A1DARs. By determining how/if the PDZ domains on the hDLG1 protein bind to the A1DAR, a more accurate depiction of this macromolecular complex can eventually be determined. Several methods were used in order to determine this. First, I cloned hDLG1 PDZ domains separately as well as varying combinations of the three domains. Next, I purified the protein constructs so I could determine the binding efficiency of the hDLG1 proteins to the A1DAR via Bio-Layer Interferometry (Octet). SNAP gel assays can also be used to determine the interaction with the A1DAR. Upon reviewing the results of these techniques, the nature of the interaction between the PDZ domains of the hDLG1 protein to the A1DAR can be determined. Understanding the architecture of this structure has many implications in pharmaceuticals as this protein can be specifically targeted by medications to treat a multitude of diseases. Side effects can be minimized by targeting specific parts of this large protein complex with medications than produce more specific responses thus limiting unwanted side effects. Medications that target the proteins involved in this complex can affect the function of the cardiovascular, urinary, and central nervous system.

## POSTER SESSION 2

MGH 241, Easel 127

1:00 PM to 2:30 PM

### **Deciphering Interactors of the $\alpha$ 1D Adrenergic Receptor**

*Diana Tram Anh Dinh, Senior, Biochemistry*

*Mentor: Chris Hague, Pharmacology, University of Washington School of Medicine*

*Mentor: Dorathy-Ann Harris, Pharmacology*

*Mentor: Eric Janezic, Pharmacology*

G Protein-Coupled Receptors (GPCRs) are seven-transmembrane proteins present throughout the body that can be activated upon binding of drugs, hormones, or neurotransmitters. Acting like an inbox for messages, these multi-protein complexes play a significant role in the body by regulating cell expression and signaling, making them attractive targets for drug development. One class of GPCRs, known as the adrenergic receptors (ARs) are critical in modulating the function of numerous targets, including cardiac muscle, vascular smooth muscle, and bronchial smooth muscle. There are nine AR subtypes: three  $\alpha$ 1s, three  $\alpha$ 2s, and three  $\beta$ s. In my research, I focus on deciphering the interactions of proteins with the  $\alpha$ 1D-AR due to a recent publication of the Hague Lab, which discovered that  $\alpha$ 1D-AR forms a multi-PDZ protein complex. To determine the participants of this complex and identify the presence of associated proteins, I first purified the proteins that potentially bind to  $\alpha$ 1D-AR. In my purification process, I first conducted Polymerase Chain Reactions (PCRs), transformed my bacteria, grew my bacteria, and finally purified my proteins of interest. With this information, my lab and I intend to identify the complexes using mass spectrometry and Octet. Determining how  $\alpha$ 1D-ARs are organized can create a deeper understanding of how drugs work in the body and assist in new drug development.

## POSTER SESSION 2

MGH 241, Easel 128

1:00 PM to 2:30 PM

### **Effects of Glycogen Metabolism on *Drosophila melanogaster* Lifespan Under Stress**

*Elise Hoffman, Senior, Public Health-Global Health*

*Julie Ann (JulieAnn) Uh, Junior, Pre-Sciences*

*Mentor: Daniel Promislow, Department of Lab Medicine & Pathology, University of Washington School of Medicine*

*Mentor: Ben Harrison, Pathology*

Multiple factors interact to determine the lifespan of an organism. The Promislow lab uses the fruit fly *Drosophila melanogaster* to study the interaction between the metabolome (the profile of all small molecules within an organism), and the lifespan of a fly under stress. In a

study of metabolome and lifespan data for many genotypes of *Drosophila*, our lab found that fly strains with relatively long lifespans when exposed to oxidative stress (peroxide food), had high levels of maltose, a disaccharide of glucose. We hypothesized that maltose was beneficial to flies on peroxide food, and tested this by supplementing the diet with maltose to see if this would extend lifespan. Flies fed supplemental maltose prior to exposure to peroxide food lived longer than flies fed unsupplemented food, supporting our hypothesis. Maltose could extend lifespan by providing energy to the fly via metabolism into glucose, or through another function as a disaccharide. To distinguish between these possibilities, we tested lactose, a disaccharide, to determine if any disaccharide could extend lifespan. Lactose did not extend lifespan, suggesting that disaccharides in general do not extend lifespan under stress. We found that glucose extended lifespan, supporting the hypothesis that maltose extends lifespan via conversion to glucose. Maltose can be stored as glycogen, a polysaccharide, and glucose is derived from glycogen by glycogen phosphorylase, encoded by the gene GlyP. To test the role of glycogen metabolism on lifespan under stress, we manipulated the expression of GlyP. Several transgenes were used to reduce the expression of GlyP by RNA interference (RNAi). RNAi of GlyP decreased lifespan, which supports our hypothesis that glucose derived from glycogen promotes survival. Our work suggests that glucose derived from glycogen or maltose is an important determinant of lifespan under stress, furthering our understanding of links between metabolism and complex phenotypes, like lifespan.

## POSTER SESSION 2

Commons East, Easel 65

1:00 PM to 2:30 PM

### **Forming Identity through Memory, History, and Place**

*Maisha Barnett, Senior, Community, Environment, & Planning*

*Mary Gates Scholar*

*Mentor: Manish Chalana, Urban Design and Planning*

*Mentor: Keith Harris, Built Environments*

This research explores the questions: How is identity shaped by our built environment? Can storytelling along with physical movement alleviate place attachment? This research also seeks to preserve the historic identity of Seattle's central district neighborhood through the memories of its residents. It is my hope that by understanding the relationship between the built environment and human consciousness, I will learn how to design spaces that nourish the human soul while honoring its physical history. To examine these questions, I conducted an extensive literature review on theories about place and identity, and the human experience of place. I also published an online survey and conducted ten oral interviews of central district residents. A composite walking tour was

then created from the physical places in their stories to highlight the overlap in their experiences, values, and identities. Through storytelling, archival research, observation, field research, map making and physical movement in these spaces, I have demonstrated a connection between memory, history, and place. My final product, a narrated walking tour, serves as a mechanism to bring people together, to educate the public about the central district and to highlight the interplay between spatial geography and social identity. The tour conjures lost places and memories into the physical world and diminishes feelings of place attachment. The tour also serves as an urban planning tool to heal displaced communities. As Seattle continues to grow and change, experiences such as this walking tour provide a living, breathing example of our shared history to anchor old residents while inspiring new citizens to honor our natural and built environment.

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## SESSION 2N

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### MCNAIR SESSION - STORYTELLING, DIGITAL VISUALIZATION, AND CORPORATE SOCIAL RESPONSIBILITY

*Session Moderator: Gabriel Gallardo, Geography*

**MGH 295**

*3:30 PM to 5:15 PM*

\* Note: Titles in order of presentation.

#### **Immersive Virtual Environments & Coalition Across Difference**

*Burren Peil, Senior, Comparative History of Ideas, Human Centered Design & Engineering*

*Mary Gates Scholar, McNair Scholar*

*Mentor: Keith Harris, Built Environments*

*Mentor: jennifer turns, Human centered design & engineering*

This project considers how we might address barriers to coalition building across difference using interdisciplinary knowledge from social psychology, neuroscience, human centered design, and critical race theory. The first question this project asks is: how might we translate strategies from social psychology that are known to increase the self-other overlap into engaging, immersive virtual experiences (IVE) for coalition building? The concept of the self-other overlap relates to coalition building because of the breadth of research indicating empathy as a self-centric process wherein people are much more likely to feel empathy for people they see as like themselves. This project focuses on IVEs because of their unique ability to create interactive, low stakes environments in which participants can embody experiences outside of their own and play with abstract ideas, such as the social con-

structs of race, sex, and gender. Given these qualities, the project seeks to specifically explore how IVEs might facilitate compassion, and thus coalition building across identity differences, such as race, gender, and nationality. This project differentiates compassion as empathy with action and views compassion as a potentially proactive approach to social equity. Because of the complex ethics involved in this endeavor, this project must also ask: how might we use human centered, participatory design and critical race theory to ethically design these experiences while motivating and supporting audiences to engage? In this way, this project proposes to use a range of design tool fidelities to discover and design for barriers to coalition building, and thus forge a bottom-up pathway from the people being represented to their IVE representations. The products of this project include a literature review and a suggested protocol for the ethical production of IVEs designed to facilitate coalition building across difference using human centered, participatory design, and critical race theory.

## POSTER SESSION 3

**Balcony, Easel 114**

*2:30 PM to 4:00 PM*

#### **Differences in Plea Negotiations Between Public and Private Defense Attorneys**

*Rocky B. (Rocky) Marks, Senior, Interdisciplinary Arts & Sciences (Psychology), UW Tacoma*

*Undergraduate Research Conference Travel Awardee*

*Mentor: Jennifer Harris, Interdisciplinary Arts and Sciences*

Within the United States, plea bargaining has become the dominant method of case resolution. The Bureau of Justice estimates that 95% of all cases processed are resolved with a plea. This study seeks to examine the factors that motivate defense attorneys in their plea recommendations. The primary factors that this study was interested in include likelihood of conviction at trial, defendant's preference over whether they would like to proceed to trial, and length of sentence if convicted. One-hundred and fifty defense attorneys were contacted through listings on the Washington State Bar Association's website, and subjects were mailed both a survey and one of eight randomized scenarios containing a potential case manipulated upon primary variable lines in a 2x2x2 fashion. These scenarios scored responses under a 5-point Likert scale ('extremely unlikely' to 'extremely likely'). Responses were analyzed in a MANOVA. Surveys were analyzed along a 5-point Likert scale ('extremely unimportant' to 'extremely important') which analyzed results through an ANOVA. Results indicate that the length of potential sentence was not significant on an attorney's recommendation to enter a plea ( $p=.43$ ); however, strength of evidence ( $p= <.001$ ) and defendant's preference ( $p= <.001$ ) both significantly impacted this recommendation. However, implicit and explicit analy-

ses of factors indicated no significant differences in plea considerations based on defense attorney subtypes. Strengths of the study include the maintaining of participant's anonymity to protect against social desirability bias, random selection and overt and covert measurement of factors. Our hypotheses lines were drawn in consideration that the 'meet-'em-and-plead-'em' model of case resolutions may have resulted in plea factor habituation. However, despite considerable limitations, assigned counsel continue to evaluate relevant factors and seek to provide the best defense possible.

## POSTER SESSION 4

**Commons East, Easel 80**

*4:00 PM to 6:00 PM*

### **Importance of Student Representation on an Institutional Governing Board in Higher Education**

*Naol Debele, Sophomore, Physics, Economics , Edmonds Community College*

*Mentor: Ruth Harris-Barnett, English , Edmonds Community College*

Community Colleges have a direct impact on our community. Governing bodies of community colleges are becoming central role players in formulating strategies for the colleges they govern. A governing Board is an important place for institutional change. The Board of an institution is responsible for decision-making, policy-making and the general oversight of an institution. The assumption is that an effective college board is one that is student-centered, and composed of positive members with good intentions, having the best interest for the college. While the effectiveness of a board remains important to the growth of an institution, most college boards tend to rely on statistical data for the decision-making process. The reliance on statistical data has proved to work in some cases; however, in the dynamic economy, we live in now, having student representation on a board can help increase the effectiveness of an institution. Student leaders bring a unique perspective to the board and can help the board understand effects of its decision on students at a college. This research investigates the importance of the student representative on governing Boards in higher education institutions. Published research papers, interviews, surveys, and personal experience as a current student Trustee on the Edmonds Community College Board of Trustee are used as a source of credible data for this paper. The paper focuses on the role and the impact of student representation on a governing board and how it can boost a college's effectiveness.

### **The Relationship Between Personality and Burnout in Community Mental Health Therapists**

*Celia Grace Schlekewey, Senior, Psychology*

*Mentor: Shannon Dorsey, Psychology*

*Mentor: Julie Harrison, Psychology*

Substantial research has examined the relationship between the Big Five personality traits (cynicism, neuroticism, openness, extraversion, and agreeableness) and burnout at the workplace, and has found that certain scores on each of these traits affect vulnerability to burnout. However, this research has not been duplicated in the population of community mental health therapists, a role that is particularly reliant upon skills that burnout can impair (e.g., reduction of empathy). Through this research, we seek to determine who is at increased risk of developing burnout by studying the relationship between Big Five personality traits and components of burnout (emotional exhaustion, depersonalization, and personal achievement). In addition, we captured the common personality profiles of this population, which indicate the proportion of community mental health therapists who may be at increased risk for burnout due to personality traits. We conducted a quantitative study using a between-subjects design. Participants were community mental health therapists across Washington state, recruited as part of a larger study. Participants completed online self-report measures related to burnout (Maslach Burnout Inventory) and personality traits (Big Five Inventory-10). We hypothesized that individuals who report high neuroticism would also report higher levels of emotional exhaustion and depersonalization and lower levels of personal accomplishment. We also hypothesized that individuals who report high conscientiousness or high extraversion would report lower levels of emotional exhaustion and depersonalization and higher levels of personal accomplishment. Our results could lead to improved methods of individualizing interventions for community mental health therapists and reduce the effects of burnout. Additionally, by capturing the common personality profiles, we can determine the types of interventions that will be applicable to the largest percentage of this population, allowing agencies to allocate their resources accordingly.

## POSTER SESSION 4

**MGH 241, Easel 159**

*4:00 PM to 6:00 PM*